

Amendment to the Claims

This listing of claims will replace the prior version in the application.

Claims

1. (canceled)
2. (previously presented) The method as claimed in claim 17, characterized in that the column (C2) is operated under conditions such that its distillate rate relative to the flow rate of (meth)acrylic acid introduced into the absorption column (C1) is between 0.5/1 and 4/1.
3. (previously presented) The method as claimed in claim 2, characterized in that the column (C2) is operated under conditions such that its distillate rate relative to the flow rate of (meth)acrylic acid introduced into the absorption column (C1) is between 2/1 and 3/1.
4. (previously presented) The method as claimed in claim 17, characterized in that the column (C1) is operated with a flow rate of said at least one heavy hydrophobic absorption solvent that is 3 to 4 times the flow rate of (meth)acrylic acid in the reaction gas mixture.
5. (previously presented) The method as claimed in claim 17, characterized in that an absorption column (C1) is used comprising:
 - in its lower part, at least one cooling section (S1) equipped with a system for recirculating, via an external heat exchanger (E1), part (3) of the stream (4) collected in the lower part of said at least one cooling section (S1) to send it to the flow of said section; and
 - in its upper part, a section (S2) for the absorption and rectification of said reaction gas mixture (1).
6. (previously presented) The method as claimed in claim 5, characterized in that a section (S2) is used, in which the number of theoretical plates is 25 to 50.
7. (previously presented) The method as claimed in claim 17, characterized in that the absorption is carried out in the column (C1) at atmospheric pressure or under a pressure close to atmospheric pressure, and at a solvent introduction temperature of 20 to 80°C.
8. (previously presented) The method as claimed in claim 17, characterized in that the column (C1) is operated at a bottom temperature of 50 to 120°C.
9. (currently amended) The method as claimed in ~~previously presented claim 17~~, characterized in that the column (C1) is operated at a overhead gas temperature of 40 to 70°C.
10. (previously presented) The method as claimed in claim 17, characterized in that the reaction

gas mixture is introduced at a temperature of 100°C to 200°C.

11. (previously presented) The method as claimed in claim 17, characterized in that one or more heavy hydrophobic absorption solvents are used, having a boiling point above 200°C at atmospheric pressure.

12. (previously presented) The method as claimed in claim 11, characterized in that ditolylether is used as a heavy hydrophobic solvent.

13. (previously presented) The method as claimed in claim 17, characterized in that the absorption column (C1) is fed solvent selected from one or more pure solvents, solvents issuing from the recycling of one or more streams obtained from the subsequent purification steps.

14. (previously presented) The method as claimed in claim 17, characterized in that the absorption is carried out in the column (C1) in the presence of at least one polymerization inhibitor, selected from phenolic derivatives, phenothiazine and its derivatives, quinones, metal thiocarbamates, compounds with nitroso groups, amines, or N-oxyl compounds.

15. (previously presented) The method as claimed in claim 17, characterized in that the gas stream (7) issuing from the top of the column (C1) is removed, partly to the reaction section, and partly to an incineration or purge step.

16. (previously presented) The method as claimed in claim 17, characterized in that the gas stream (7) issuing from the top of the column (C1) is sent to the bottom of a condensation section (S3) where said gas stream (7) is placed in intimate contact with a descending liquid stream (7') supplied at the flow of said section (S3) and consisting of the recycling of part of the bottom stream of said section (S3) previously cooled by an external heat exchanger (E4).

17. (previously presented) A process for the purification of (meth)acrylic acid from reaction gas mixture obtained by catalytic or redox oxidation of a gas selected from the group consisting of propane, propylene, acrolein, isobutane, isobutene, tertbutyl alcohol, (meth)acrolein and mixture thereof, characterized in that:

said purification takes place in the presence of at least one polymerization inhibitor;

said reaction gas mixture (1) is sent to the bottom of an absorption column (C1) which is supplied at the top and in countercurrent flow with at least one heavy hydrophobic absorption solvent or solvents, to obtain:

- at the top of the column (C1) a gas stream (7) consisting of propane, propylene, isobutane, isobutene, the products of the final oxidation of the reaction gas mixture (1), major quantities of water, acetic acid, acrylic acid, acrolein and mixtures thereof;
- at the bottom of said column (C1), a stream (4) consisting of (meth) acrylic acid, said at least one heavy absorption solvent or solvents, minor quantities of acetic acid, water, acrylic acid and mixtures thereof;

the stream (4) issuing from the bottom of column (C1) is sent to a separation column (C2) in which a separation is carried out to obtain:

- at the top of column (C2), a stream (5) consisting of light impurities which are sent to the bottom of absorption column (C1); and
- at the bottom, a stream (6) consisting of components selected from the group consisting of (meth)acrylic acid in solution in the at least one heavy absorption solvent or solvents, a small proportion of acetic acid, acrylic acid, polymerization inhibitor or inhibitors and mixtures thereof

characterized in that column (C1) is operated with flow rate of said at least one heavy hydrophobic absorption solvent or solvents that is 3 to 5.6 times the flow rate of (meth)acrylic acid in the reaction gas mixture, and in that, as a separation column (C2), a rectification column is used, which is operated with a top feed and without reflux and without the introduction of external inert gas.

18. (previously presented) The method as claimed in claim 5, characterized in that a section (S2) is used, in which the number of theoretical plates is 30 to 45.
19. (previously presented) The method as claimed in claim 17, characterized in that the absorption is carried out in the column (C1) at atmospheric pressure or under a pressure close to atmospheric pressure, and at a solvent introduction temperature of 30 to 60°C.
20. (previously presented) The method as claimed in claim 17, characterized in that the column (C1) is operated at a bottom temperature of 70 to 100°C.
21. (previously presented) The method as claimed in claim 17, characterized in that the column (C1) is operated at a overhead gas temperature of 50 to 60°C.
22. (previously presented) The method as claimed in claim 17, characterized in that the reaction gas mixture is introduced at a temperature of 130°C to 180°C.
23. (previously presented) The method as claimed in claim 17, characterized in that the absorption is carried out in the column (C1) in the presence of at least one polymerization inhibitor, selected from

hydroquinone and its derivatives such as methyl ether of hydroquinone, methylene blue, benzoquinone, copper dibutyldithiocarbamate, N-nitroso-phenylhydroxylamine, derivatives of paraphenylenediamine, or 4-hydroxy-2,2,6,6-tetramethylpiperidine-N-oxyl.